

We claim:

1. A method for forming a smooth interface between a silicon surface and a dielectric layer comprising:

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providing a silicon substrate with an upper surface;

forming an amorphous region in said upper surface by
exposing said upper surface to halogen species; and

forming a dielectric layer on said amorphous region.

2. The method of claim 1 further comprising removing a thin
dielectric layer from said upper surface prior to forming said
amorphous region.

3. The method of claim 1 wherein said forming said amorphous
further comprises:

20 exposing a chlorine containing gas to UV radiation to form
excited chlorine species;

heating said upper surface to a temperature between 50oC
and 250oC; and

exposing said heated upper surface to said excited chlorine species.

5 4. The method of claim 1 wherein said dielectric layer is formed using a material selected from the group consisting of silicon oxide, silicon nitride, silicon oxynitride, and a silicate.

10 5. A method for forming an interface between a silicon surface and a dielectric layer comprising:

providing a silicon substrate with an upper surface;

15 forming an amorphous region in said upper surface by exposing said upper surface to halogen species;

forming a capping layer on said amorphous region; and

forming a dielectric layer on capping layer.

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6. The method of claim 1 further comprising removing a thin dielectric layer from said upper surface prior to forming said amorphous region.

7. The method of claim 1 wherein said halogen species is selected from the group consisting of chlorine, bromine, iodine and fluorine.

5 8. The method of claim 1 wherein said forming said amorphous further comprises:

exposing a chlorine containing gas to UV radiation to form excited chlorine species;

10 heating said upper surface to a temperature between 50°C and 250°C; and

15 exposing said heated upper surface to said excited chlorine species.

9. The method of claim 1 wherein said dielectric layer is formed using a material selected from the group consisting of silicon oxide, silicon nitride, silicon oxynitride, and a silicate.